

## SEQUENCE LISTING

&lt;110&gt; OmniGene Bioproducts, Inc., et al.

<120> MICROORGANISMS AND PROCESSES FOR ENHANCED PRODUCTION OF  
PANTOTHENATE

&lt;130&gt; BGI-154PC2

&lt;150&gt; 60/393826

&lt;151&gt; 2002-07-03

&lt;160&gt; 31

&lt;170&gt; PatentIn Ver. 2.0

&lt;210&gt; 1

&lt;211&gt; 194

&lt;212&gt; DNA

&lt;213&gt; Artificial Sequence

&lt;220&gt;

<223> Description of Artificial Sequence:promoter  
sequence

&lt;220&gt;

&lt;221&gt; -35\_signal

&lt;222&gt; (136)..(141)

&lt;220&gt;

&lt;221&gt; -10\_signal

&lt;222&gt; (159)..(164)

&lt;400&gt; 1

```
gctattgacg acagctatgg ttcactgtcc accaaccaaa actgtgctca gtaccgccaa 60
tatttctccc ttgaggggta caaagagggtg tccctagaag agatccacgc tgtgtaaaaa 120
ttttacaaaa aggtattgac tttccctaca ggggtgtgtaa taatttaatt acaggcgggg 180
gcaaccccg cgtg                                     194
```

&lt;210&gt; 2

&lt;211&gt; 163

&lt;212&gt; DNA

&lt;213&gt; Artificial Sequence

&lt;220&gt;

<223> Description of Artificial Sequence:promoter  
sequence

&lt;220&gt;

&lt;221&gt; -35\_signal

&lt;222&gt; (113)..(118)

&lt;220&gt;

&lt;221&gt; -10\_signal

&lt;222&gt; (136)..(141)

<400> 2  
gcctacctag cttccaagaa agatataccta acagcacaag agcggaaaga tgttttgttc 60  
tacatccaga acaacctctg ctaaaattcc tgaaaaattt tgcaaaaagt tgttgacttt 120  
atctacaagg tgtggtataa taatcttaac aacagcagga cgc 163

<210> 3  
<211> 127  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:promoter  
sequence

<220>  
<221> -35\_signal  
<222> (34)..(39)

<220>  
<221> -10\_signal  
<222> (58)..(63)

<220>  
<221> -35\_signal  
<222> (75)..(80)

<220>  
<221> -10\_signal  
<222> (98)..(103)

<400> 3  
gaggaatcat agaattttgt caaaataatt ttattgacaa cgtcttatta acgttgatat 60  
aatttaaatt ttatttgaca aaaatgggct cgtgtgttac aataaatgta gtgagggtgga 120  
tgcaatg 127

<210> 4  
<211> 24  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:ribosome  
binding site

<400> 4  
taaacatgag gaggagaaaa catg 24

<210> 5  
<211> 28  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:ribosome  
binding site

<400> 5  
attcgagaaa tggagagaat ataatatg

28

<210> 6  
<211> 13  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:ribosome  
binding site

<400> 6  
agaaaggagg tga

13

<210> 7  
<211> 23  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:ribosome  
binding site

<220>  
<221> misc\_feature  
<222> 17, 18, 19, 20  
<223> n = a, t, c, or g

<400> 7  
ttaagaaagg aggtgannnn atg

23

<210> 8  
<211> 23  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:ribosome  
binding site

<220>  
<221> misc\_feature  
<222> 16, 17, 18, 19, 20  
<223> n = a, c, t, or g

<400> 8  
ttagaaagga ggtgannnnn atg

23

<210> 9  
<211> 23  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:ribosome  
binding site

<220>  
<221> misc\_feature  
<222> 14, 15, 16, 17, 18, 19, 20  
<223> n = a, c, t, or g

<400> 9  
agaaaggagg tgannnnnnn atg 23

<210> 10  
<211> 22  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:ribosome  
binding site

<220>  
<221> misc\_feature  
<222> 14, 15, 16, 17, 18, 19  
<223> n = a, c, t, or g

<400> 10  
agaaaggagg tgannnnnnna tg 22

<210> 11  
<211> 25  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:ribosome  
binding site

<400> 11  
ccctctagaa ggaggagaaa acatg 25

<210> 12  
<211> 24  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:ribosome  
binding site

<400> 12  
ccctctagag gaggagaaaa catg 24

<210> 13  
<211> 23  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:ribosome  
binding site

<400> 13  
ttagaaagga ggattttaa atg

23

<210> 14  
<211> 23  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:ribosome  
binding site

<400> 14  
ttagaaagga ggtttaatta atg

23

<210> 15  
<211> 23  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:ribosome  
binding site

<400> 15  
ttagaaagga ggtgatttaa atg

23

<210> 16  
<211> 23  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:ribosome  
binding site

<400> 16  
ttagaaagga ggtgtttaaa atg

23

<210> 17  
<211> 28  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:ribosome  
binding site

<400> 17  
attcgagaaa ggaggtgaat ataatatg

28

<210> 18  
<211> 27  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:ribosome  
binding site

<400> 18  
attcgagaaa ggaggtgaat aataatg 27

<210> 19  
<211> 28  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:ribosome  
binding site

<400> 19  
attcgtagaa aggaggtgaa ttaatatg 28

<210> 20  
<211> 51  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:5' PCR primer  
<223> for serA gene

<400> 20  
ccctctagag gaggagaaaa catgtttcga gtattggtct cagacaaaat g 51

<210> 21  
<211> 43  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:3' PCR primer  
<223> for serA gene

<400> 21  
cccggatcca attatggcag atcaatgagc ttcacagaca caa 43

<210> 22  
<211> 48  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:5' PCR primer  
<223> for glyA gene

<400> 22  
ggatctagag gaggtgtaaa catgaaacat ttacctgctc aagacgaa 48

<210> 23  
<211> 43  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:3' PCR primer  
<223> for glyA gene

&lt;400&gt; 23

cggggatccc ccatcaacaa ttacacactt ctattgattc tac

43

&lt;210&gt; 24

&lt;211&gt; 7926

&lt;212&gt; DNA

&lt;213&gt; Artificial Sequence

&lt;220&gt;

&lt;223&gt; Description of Artificial Sequence:serA overexpression

&lt;223&gt; plasmid

&lt;400&gt; 24

```

gaattttgcg gccgcttcga aagctgtaat ataaaaacct tcttcaacta acggggcgagg 60
ttagtgacat tagaaaaccg actgtaaaaa gtacagtcgg cattatctca tattataaaa 120
gccagtcatt aggcctatct gacaattcct gaatagagtt cataaacat cctgcatgat 180
aaccatcaca aacagaatga tgtacctgta aagatagcgg taaatatatt gaattacctt 240
tattaatgaa ttttcctgct gtaataatgg gtagaaggta attactatta ttattgatat 300
ttaagttaaa ccagtaaat gaagtccatg gaataataga aagagaaaaa gcattttcag 360
gtataggtgt tttgggaaac aatttccccg aaccattata tttctctaca tcagaaaggt 420

ataaatcata aaactctttg aagtcattct ttacaggagt ccaaatacca gagaatgttt 480
tagatacacc atcaaaaatt gtataaagtg gctctaactt atcccaataa cctaactctc 540
cgtcgctatt gtaaccagtt ctaaaagctg tatttgagtt tatcaccctt gtcactaaga 600
aaataaatgc agggtaaaat ttatatcctt cttgttttat gtttcggtat aaaacactaa 660
tatcaatttc tgtggttata ctaaaagtcg tttgttggtt caaataatga ttaaatactt 720
cttttctctt ccaattgtct aaatcaattt tattaaagtt cttttgatat gcctcctaaa 780
tttttatcta aagtgaattt aggaggctta cttgtctgct ttcttcatta gaatcaatcc 840
ttttttaaaa gtcaatatta ctgtaacata aatatatatt ttaaaaatat ccacttttat 900
ccaattttcg tttgttgaa taatgggtgc tttagttgaa gaataaagac cacattaaaa 960
aatgtgggtc tttgtgtttt tttaaaggat ttgagcgtag cgaaaaatcc ttttctttct 1020
tatcttgata ataagggtaa ctattgaatt cgttaccag agtttgtaga aacgcaaaaa 1080
ggccatccgt caggatggcc ttctgcttaa tttgatgcct ggcagtttat ggcgggcgctc 1140
ctgcccgcga cctccggggc cgttgcttcg caacgttcaa atccgctccc ggcggttttg 1200
tcctactcag gagagcgttc accgacaaac aacagataaa acgaaaggcc cagtccttcg 1260
actgagcctt tcgttttatt tgatgcctgg cagttcccta ctctcgcatg gggagacccc 1320
aactaccat cggcgctacg gcgtttcact tctgagttcg gcagggggtc aggtgggacc 1380
accgcgtac tgccgccagg caaattctgt tttatcagac cgcttctgct ttctgattta 1440
atctgtatca ggctgaaaat cttctctcat ccgccaaaac aggatccaat tatggcagat 1500
caatgagctt cacagacaca atatcaggga catttgtagt ttctttcaca attttatctt 1560
ccagatgtct gtcaaaaggaa agcatcatga tggcttctcc gccttttcc ttacggccaa 1620
cctgcatagt tgcaatgtta atatcattat cctccgaaat acgtcctact cggccgatga 1680
cacctgttgt atcttgatgc tggatafaca ccaagtgaac agtcggataa aaatcaatat 1740
taaattccatt gatctcgaca attcgttctc cgaaatgagg aatatacgta gccgttacag 1800
taaagggtgct gcggtctcct gtcactttta cgtgatgca gttatcgat ccagattcag 1860
aagaggaat tttttcactg aagctaattgc cgcgttcttt tgcgacaccc ccggcattga 1920
cctcattaac agtagagtct acgcgcggtt ttaaaaagcc tgacagaagg gcttttgtaa 1980
tgaacgatgt ttcaagttta gcaattgtgc cttcatattg aatggcaaca tcctgtactg 2040
gttctttcat gcactgtgat acaaggctgc caatttttcc tgcaatttga tggttaaggct 2100
taatttttagc aaattcatct tttgtcatgg caggcaggtt gatagctgac atgacaggca 2160
ggccttttgc gaactgcaga acttcttctg acacttgggc ggcgacattg agctgtgctt 2220
ctttcgttga tgctcccaag tgaggagtgg caatgaactaa tggatgatca acaagtttgt 2280
tgtcaactgg cggttcgact tcgaaaacgt caagcgtgct tcccgcacaa tgcccgtttt 2340
ccaaagcttc gagaagtgtc gcttcacgta taattccgcc tcgcgcacag ttaattaagc 2400
gaacgccttt tttcgttttt gcaatcgttt ctttattcaa taagcctttt gtttcttttg 2460
ttaaaggcgt gtgaacggta atgatatccg cactttcaag cacttcttca aatgtacggc 2520
tgtttacgcc gatttttttc getctttctt cgtttaagaa aggatcaaaa acgtgcacag 2580
tcataccgaa cgctcctega cgtgtgcaa tttcacttcc gattcggcct aatcctacaa 2640
taccagcgt ttttcataa agctctgaac cgacataagc tgtgcggttc cactctctgg 2700
atttcactga gatattagcc tgcggaatgt gtctcatta agaagagatc attgcaaatg 2760
tatgtctcagc tgtcgaaatg gtgttgccgt tcggagcatt gatcacgatt accccgtggt 2820

```

tcgtagcctc	atcaatatcg	atattatcga	caccgacacc	ggctcttcog	acaattttta	2880
aagaagtcac	tttgttgaaa	aggtcttctg	ttacttttgt	cgcgcttcgc	accaaaagag	2940
catcaaaagt	atgtaattca	tcttctgcat	ctgctacgtt	tttttgaacg	atttcaataa	3000
agtctgattc	aataaagtgc	tgtaaaccgt	cgttgctcat	tttgtctgag	accaatactc	3060
gaaacatggt	ttctcctcct	ctagagcgtc	ctgtgttgtt	taagattatt	ataccacacc	3120
ttgtagataa	agtcaacaac	tttttgcaaa	atttttcagg	aatttttagca	gagggtgttc	3180
tggatgtaga	acaaaacatc	tttccgctct	tgtgctgtta	ggatatcttt	cttggaagct	3240
aggtaggcct	cgagttatgg	cagttgggta	aaaggaaaca	aaaagaccgt	tttcacacaa	3300
aacgggtctt	ttcgatttct	ttttacagtc	acagccactt	ttgcaaaaac	cggacagctt	3360
catgccttat	aactgctggt	tcggctcgaca	agcttcgcga	agcggccgca	aaattcactg	3420
gccgtcggtt	tacaacgtcg	tgactgggaa	aaccctggcg	ttacccaact	taatcgctt	3480
gcgacacatc	cccccttcgc	cagctggcgt	aatagcgaag	aggcccgcac	cgatcgccct	3540
tccaacaggt	tgccgagcct	gaatggcgaa	tggcgccgtg	tgcgggtatt	tctccttacg	3600
catctgtgcg	gtatttcaca	cgcacatagg	tgcactctca	gtacaatctg	ctctgatgcc	3660
gcatagttaa	gccagccccg	acacccgcca	acacccgctg	actatgcttg	taaaccgttt	3720
tgtgaaaaaa	ttttttaaata	aaaaaagggg	acctctaggg	tccccaatta	attagtaata	3780
taatctatta	aagggtcattc	aaaaggtcat	ccaccggatc	agcttagtaa	agccctcgct	3840
agattttta	gcggatgttg	cgattacttc	gccaaactat	gcgataacaa	gaaaaagcca	3900
gcctttcatg	atatatctcc	caattttgtg	agggcttatt	atgcacgctt	aaaaataata	3960
aaagcagact	tgacctgata	gtttggctgt	gagcaattat	gtgcttagtg	catctaacgc	4020
ttgagttaag	ccgcgcgcgc	aagcggcgct	ggcttgaacg	aattgttaga	cattatttgc	4080
cgactacctt	ggtagctctc	cctttcacgt	agtggacaaa	ttcttccaac	tgatctgcgc	4140
gcgaggccaa	gcgatcttct	tcttgtccaa	gataagcctg	tctagcttca	agtatgacgg	4200
gctgatactg	ggccggcgagg	cgtccatttg	cccagtcggc	agegacatcc	ttcggcgcca	4260
ttttgcccgt	tactgcgctg	taccaaatgc	gggacaacgt	aagcactaca	tttcgctcat	4320
cgccagccca	gtcggggcgc	gagttccata	gcgttaaggt	ttcatttagc	gcctcaaata	4380
gatcctgttc	aggaaccgga	tcaaagaggt	cctccgcgcg	tggacctacc	aaggcaacgc	4440
tatgttctct	tgcttttgtc	agcaagatag	ccagatcaat	gtcgatcggt	gctggctcga	4500
agatacctgc	aagaatgtca	ttgcgctgcc	attctccaaa	ttgcagttcg	cgcttagctg	4560
gataacgcca	cggaatgatg	tgcgtgtgca	caacaatggt	gacttctaca	gcgcggagaa	4620
tctcgctctc	tccaggggaa	gccgaagttt	ccaaaaggtc	gttgatcaaa	gctcgcgcgc	4680
ttgtttcatc	aagccttacg	gtcaccgtaa	cacgcaaatc	aatatcactg	tgtggcttca	4740
ggccgccatc	cactgcggag	cgtacaaat	gtacggccag	caacgtcggg	tcgagatggc	4800
gctcgatgac	gccaactacc	tctgatagtt	gagtcgatac	ttcggcgatc	accgcttccc	4860
tcatgatgtt	taactttgtt	ttagggcgac	tgccctgctg	cgtaacatcg	ttgctgctcc	4920
ataacatcaa	acatcgaccc	acggcgtaac	gcgcttgctg	cttggtatgcc	cgaggcatag	4980
actgtacccc	aaaaaaacag	tcataacaag	ccatgaaaac	cgccactgcg	ccgttaccac	5040
cgtgcggttc	ggtcaagggt	ctggaccagt	tgcgtgagcg	catacgctac	ttgcattaca	5100
gcttacgaac	cgaacaggct	tatgtccact	gggttcgtgc	cttcacccgt	ttccacgggtg	5160
tgcgtcaccc	ggcaaccttg	ggcagcagcg	aagtcgaggg	atttctgtcc	tggttggcga	5220
acgagcgcaa	gggttcgggtc	tccacgcac	gtcaggcatt	ggcggccttg	ctgttcttct	5280
acggcaagggt	gctgtgcacg	gatctgcctt	ggcttcaggga	gateggaaga	cctcggccgt	5340
cgcggcgctt	gccgggtggtg	ctgaccccg	atgaagtgg	tcgcatcctc	ggttttctgg	5400
aaggcgagca	tcgtttgttc	gccagcttc	tgtatggaac	gggcatgcgg	atcagtgagg	5460
gtttgcaact	gcgggtcaag	gatctggatt	tcgatcaegg	cacgatcatc	gtgcgggagg	5520
gcaaggggtc	caaggatcgg	gccttgatgt	tacccgagag	cttggcacc	agcctgcgcg	5580
agcaggggaa	ttgatccggt	ggatgacctt	ttgaatgacc	tttaatagat	tatattacta	5640
attaattggg	gaccctagag	gtccctttt	ttatttttaa	aattttttca	caaaacgggt	5700
tacaagcata	acgggttttg	ctgcccgcga	acgggctggt	ctgggtgttg	tagtttggtta	5760
tcagaatcgc	agatccggct	tcagggttgc	cggctgaaag	cgtattttct	tccagaattg	5820
ccatgatttt	ttccccaacg	gaggcgtcac	tggctcccg	gttgcggca	gctttgattc	5880
gataagcagc	atgcctgtt	tcaggctgtc	tatgtgtgac	tgttgagctg	taacaagttg	5940
tctcaggtgt	tcaatttcat	gttctagtgt	ctttgtttta	ctggtttcac	ctgttctatt	6000
aggtgttaca	tgtgtttcat	ctgttacatt	gtcgatctgt	tcattggtgaa	cagctttaaa	6060
tgcacaaaaa	actcgtaaaa	gctctgatgt	atctatcttt	tttacaccgt	tttcatctgt	6120
gcatatggac	agttttccct	ttgatattca	acggtgaaca	gttgttctac	ttttgtttgt	6180
tagtcttgat	gcttccactga	tagatacaag	agccataaga	acctcagatc	cttccgtatt	6240
tagccagtat	gttctctagt	gtggttcgtt	gtttttgcgt	gagccatgag	aacgaacct	6300
tgagatcatg	cttactttgc	atgtcactca	aaaattttgc	ctcaaaactg	gtgagctgaa	6360
tttttgcagt	taaagcatcg	tgtagtgttt	ttcttagtcc	gttacgtagg	taggaatctg	6420
atgtaatggg	tgttgggtatt	ttgtcaccat	tcatttttat	ctgggtgttc	tcaagttcgg	6480



```

ttacgagatc catttgtcta tctagttcaa cttggaaaat caacgtatca gtcgggcggc 6540
ctcgcttatc aaccaccaat ttcattttgc tgtaagtgtt taaatcttta cttattgggtt 6600
tcaaaaccca ttggttaagc ctttttaaact catggtagtt attttcaagc attaacatga 6660
acttaaatc atcaaggcta atctctatat ttgccttgty agttttcttt tgtggttagtt 6720
cttttaataa ccactcataa atcctcatag agtattttgtt ttcaaaagac ttaacatggtt 6780
ccagattata ttttatgaat ttttttaact ggaaaagata aggcaatata tcttcaactaa 6840
aaactaatc taatttttctg cttgagaact tggcatagtt tgtccactgg aaaatctcaa 6900
agcctttaac caaaggattc ctgatttcca cagtctctgt catcagctct ctggttgctt 6960
tagctaatac accataagca ttttcctac tgatgttcat catctgagcg tattggttat 7020
aagtgaacga taccgtccgt tctttccttg tagggttttc aatcgtgggg ttgagtagtg 7080
ccacacagca taaaattagc ttggtttcat gctecgttaa gtcatacgca ctaatcgcta 7140
gttcatttgc tttgaaaaca actaattcag acatacatct caattggtct aggtgatttt 7200
aatcactata ccaattgaga tgggctagtc aatgataatt actagtcctt ttcctttgag 7260
ttgtgggtat ctgtaaattc tgctagacct ttgctggaaa acttgtaaat tctgctagac 7320
cctctgtaaa ttccgctaga cctttgtgtg ttttttttgt ttatattcaa gtggttataa 7380
tttatagaat aaagaaagaa taaaaaaaga taaaaagaat agatcccagc cctgtgtata 7440
actcactact ttagtcagtt ccgcagttat acaaaaggat gtcgcaaagc ctggttgctc 7500
ctctacaaaa cagaccttaa aaccctaaag gcttaagtag caccctcgca agctcgggca 7560
aatcgctgaa tattcctttt gtctccgacc atcaggcacc tgagtcgctg tcttttctgt 7620
gacattcagt tcgctgctgt cacggctctg gcagtgaatg ggggtaaatg gcactacagg 7680
cgctttttat ggattcatgc aaggaaacta ccataatac aagaaaagcc cgtcacgggc 7740
ttctcagggc gttttatggc ggggtctgcta tgtggtgcta tctgactttt tgctgttcag 7800
cagttcctgc cctctgattt tccagtctga ccacttcgga ttatcccgtg acaggtcatt 7860
cagactggct aatgcacca gtaaggcagc ggtatcatca acaggcttac cgtcttact 7920
gtcaac

```

7926

&lt;210&gt; 25

&lt;211&gt; 7701

&lt;212&gt; DNA

&lt;213&gt; Artificial Sequence

&lt;220&gt;

&lt;223&gt; Description of Artificial Sequence:glyA overexpression

&lt;223&gt; plasmid

&lt;400&gt; 25

```

gaattttgcg gccgcttcga aagctgtaat ataaaaacct tcttcaacta acggggcgagg 60
ttagtgacat tagaaaaacg actgtaaaaa gtaagatcgg cattatctca tattataaaa 120
gccagtcatt aggcctatct gacaattcct gaatagagtt cataaacaat cctgcatgat 180
aaccatcaca aacagaatga tgtacctgta aagatagcgg taaatatatt gaattacctt 240
tattaatgaa ttttctctgt gtaataatgg gtagaaggta attactatta ttattgatat 300
ttaagttaaa ccagtaaat gaagtccatg gaataataga aagagaaaaa gcattttcag 360
gtatagggtg tttgggaaac aatttccccg aaccattata tttctctaca tcagaaaggt 420
ataaatcata aaactctttg aagtcattct ttacaggagt ccaaatacca gagaatgttt 480
tagatacacc atcaaaaatt gtataaagtg gctctaactt atcccaataa cctaactctc 540
cgtcgctatt gtaaccagtt ctaaaagctg tatttgagtt tatcaccctt gtcactaaga 600
aaataaatgc aggttaaaat ttatatcctt cttgtttttat gtttcggtat aaaacactaa 660
tatcaatttc tgtggttata ctaaaagtcg tttgttggtt caaataatga ttaaataatct 720
cttttctctt ccaattgtct aatatcaatt tattaaagtt catttgatat gcctcctaaa 780
tttttatcta aagtgaattt aggaggctta ctgtctgtct ttcttcatta gaatcaatcc 840
ttttttaaaa gtcaatatta ctgtaacata aatatatatt ttaaaaatat ccaactttat 900
ccaattttcg tttgttgaa taatgggtgc tttagttgaa gaataaagac cacattaaaa 960
aatgtgggtc tttgtgtttt tttaaaggat ttgagcgtag cgaaaaatcc ttttctttct 1020
tatcttgata ataagggtaa ctattgaatt cgggtaccaag agtttgtaga aacgcaaaaa 1080
ggccatccgt caggatggcc ttctgcttaa tttgatgcct ggcagtttat ggcgggctgc 1140
ctgcccgcca cctccgggc cgttgcttcg caacgttcaa atccgctccc ggcggatttg 1200
tcctactcag gagagcgttc accgacaaac aacagataaa acgaaaggcc cagtctttcg 1260
actgagcctt tcgtttttatt tgatgcctgg cagttcccta ctctcgcagt gggagacccc 1320

```

acactacat	cggcgctacg	gcgtttcact	tctgagttcg	gcatgggggc	aggtgggacc	1380
accgcgctac	tgccgccagg	caaattctgt	tttatcagac	cgcttctgcg	ttctgattta	1440
atctgtatca	ggctgaaaat	cttctctcat	ccgccaaaac	aggatcccc	atcaacaatt	1500
acacacttct	attgattcta	caaaaaaaga	cattgagttt	caagaacatc	gtcaaaaaac	1560
ccgccgggca	taagcccaag	cgggttttag	gatcttaata	atctaattct	ttatataaag	1620
gaaatttatc	agtcagagca	gctacacgct	gtcttgcttc	ttcaagtttt	ccttcatctt	1680
cgtgggtttt	caatgcaagc	gcaatgatag	caccgacttc	ttctaattgcg	tctccgtcaa	1740
aaccgcggct	ggttacagca	gctgtacca	gacggatgcc	gcttgttacg	aaagggtttt	1800
caggatcata	tggaatcgcg	tttttgtag	acgtaatacc	aatttcatca	agtacatgct	1860
ccgcaacctt	accagtcagt	ccgagcgga	gaaggccaac	aaggataagg	tggttgctcg	1920
ttccgcctga	aacgagctgg	atgcccctct	tcgttaaggc	ttcagccaga	cgtttcgcgt	1980
ttgaaatgac	gttttggtga	tatgttttga	aatcgctcctg	caatacttca	ccgaatgaaa	2040
cagcttttgc	ggcaataacg	tgcatacagag	ggccgccttg	aattccaggg	aagatcgatt	2100
tatcaatttt	cttgccaaac	tcttcacggc	aaaggatcat	accgcgcgga	ggaccgcgaa	2160
gtgttttatg	tggttggtgt	gtaacgaaat	cagcgtaagg	aaccgggttt	ggatgaaggc	2220
ctgcccgaac	aagtcctgcg	atatgtgcca	tatccaccat	gaagtaagcg	ccgacttcat	2280
cagcaatttc	acggaatttc	ttaaagtcga	ttgtacgagg	atacgcactt	gctcctgcta	2340
cgataagctt	cggtttatga	gcgagggtct	tttcacgcac	gtcatcgtaa	tcaatatatt	2400
gagtttcttt	atctacgcgc	tactcaacaa	agttatatgt	aacaccgctg	aagttgactg	2460
ggcttccgtg	tggttaaagtg	ccgccgtggg	agagggtcat	cccaagtaca	gtatcgctt	2520
gctccaaaat	cgtgaagtac	actgccatgt	ttgcttggtg	gcctgaatga	ggctgaacgt	2580
ttacatgctc	cgctccaaag	atttccctcg	cgccgtcacg	ggcgatatct	tcaacgacat	2640
cgacgtgctc	gcateccgcg	tagtagcggt	tgcccggata	tccttctgcg	tacttatttg	2700
tcaaaacaga	tccttggtgt	tccataaccg	cttcacttac	aaagttctca	gaagcaatca	2760
attcgactct	agtcgtgtgg	cgttcacgct	catttttaat	ggcgtaaac	acttggtcgt	2820
cttgccgagg	taaatgtttc	atgtttacac	ctcctctaga	gcgtcctgct	gttggttaaga	2880
ttattatacc	acaccttgta	gataaagtca	acaacttttt	gcaaaatttt	tcaggaattt	2940
tagcagaggt	tggttctggat	gtagaacaaa	acatctttcc	gctcttggtg	tgtaggata	3000
tctttcttgg	aagctaggta	ggcctcgagt	tatggcagtt	ggttaaaagg	aaacaaaaag	3060
accgttttca	cacaaaacgg	tctttttcga	tttcttttta	cagtcacagc	cacttttgca	3120
aaaaccggac	agcttcatgc	cttataactg	ctgtttcggt	cgacaagctt	cgccaagcgg	3180
ccgcaaaatt	cactggccgt	cgttttacaa	cgctgtgact	gggaaaaccc	tgccgttacc	3240
caacttaate	gccttgacgc	acatccccct	ttccgccagt	ggcgtaatag	cgaagaggcc	3300
cgaccgatac	gcccttccca	acagttgcgc	agcctgaatg	gcgaatggcg	cctgatgcgg	3360
tattttctcc	ttacgcacat	gtgcggtatt	tcacaccgca	tatggtgcac	tctcagtaca	3420
atctgctctg	atgccgcata	gttaagccag	ccccgacacc	cgccaacacc	cgctgactat	3480
gcttgtaaac	cgttttggtga	aaaaattttt	aaaataaaaa	aggggacctc	taggggtccc	3540
aattaattag	taatataatc	tattaaaggt	cattcaaaag	gtcatccacc	ggatcagctt	3600
agtaaagccc	tcgctagatt	ttaatgcgga	tggtgcgatt	acttcgcca	ctattgcgat	3660
aacaagaaaa	agccagcctt	tcatgatata	tctcccaatt	tgtgtagggc	ttattatgca	3720
cgcttaaaaa	taataaaagc	agacttgacc	tgatagtttg	gctgtgagca	attatgtgct	3780
tagtgactct	aacgcttgag	ttaagccgcg	ccgcgaagcg	gcgtcggctt	gaacgaattg	3840
ttagacatta	tttgccgact	accttggtga	tctcgccttt	cacgtagtgg	acaaattctt	3900
ccaactgata	tgccgcgcag	gccaaagcat	cttctctttg	tccaagataa	gcctgtctag	3960
cttcaagtat	gacgggctga	tactgggccc	gcaggcgctc	cattgcccag	tcggcagcga	4020
catccttcgg	cgcgattttg	ccggttactg	cgctgtacca	aatgcggggc	aacgtaagca	4080
ctacatttcg	ctcatcgcca	gccagtcggg	gcggcgagtt	ccatagcgtt	aaggtttcat	4140
ttagcgcctc	aaatagatcc	tggttcaggaa	ccggatcaaa	gagttcctcc	gccgctggac	4200
ctaccaaggc	aacgctatgt	tctcttgctt	ttgtcagcaa	gatagccaga	tcaatgtcga	4260
tcgtggctgg	ctcgaagata	cctgcaagaa	tgctattgct	ctgccattct	ccaaattgca	4320
gttcgcgctt	agctggataa	cgcacaggaa	tgatgtcgct	gtgcacaaca	atggtgactt	4380
ctacagcgcg	gagaattctg	ctctctccag	gggaagccga	agtttccaaa	aggtcgttga	4440
tcaaagctcg	ccgcgtttgt	tcatcaagcc	ttacgggtcac	cgttaaccagc	aaatcaatat	4500
cactgtgtgg	cttcaggccg	ccatccactg	cggagccgta	caaattgtacg	gccagcaacg	4560
tcggttcgag	atggcgctcg	atgacgccaa	ctacctctga	tagttgagtc	gatacttcgg	4620
cgatcacccg	ttccctcatg	atgttttaact	ttgttttagg	gcgactgccc	tgctgcgtaa	4680
catcgttgct	gctccataac	atcaaacatc	gacccacggc	gtaacgcgct	tgctgcttgg	4740
atgcccgagg	catagactgt	accccaaaaa	aacagtcata	acaagccatg	aaaaccgcca	4800
ctgcgcgctt	accaccgctg	cgttcgggtca	aggttctgga	ccagttgcgt	gagcgcatat	4860
gctacttgca	ttacagctta	cgaaccgaac	aggcttatgt	ccactgggtt	cgtgccttca	4920
tccgtttcca	cgggtgtgct	caccgggcaa	ccttgggagc	cagcgaagtc	gaggcatttc	4980

```

tgtcctggct ggcgaacgag cgcaagggtt cgggtctccac gcatcgctcag gcattggcgg 5040
ccttgctgtt cttctacggc aagggtgctgt gcacggatct gccctggctt caggagatcg 5100
gaagaccteg gccgtcgagg cgcttgccgg tgggtgetgac cccggatgaa gtgggttcgca 5160
tcctcggttt tctggaaggc gagcatcggt tgttcgccca gcttctgtat ggaacgggca 5220
tgcggatcag tgagggtttg caactgcggg tcaaggatct ggatttcgat cacggcacga 5280
tcacgtgag ggagggcaag ggctccaagg atcgggcctt gatgttacc gagagcttgg 5340
cacccagcct gcgcgagcag gggaattgat ccgggtggatg accttttgaa tgacctttaa 5400
tagattatat tactaattaa ttggggaccc tagagggtccc cttttttatt ttaaaaattt 5460
tttcacaaaa cggtttataa gcataacggg ttttgctgcc cgcaaacggg ctgttctggg 5520
gttgctagtt tgttatcaga atcgagatc cggcttcagg tttgccggct gaaagcgcta 5580
tttcttccag aattgccatg attttttccc cacgggaggc gtcactgggt cccgtgttgt 5640
cggcagcttt gattcgataa gcagcatcgc ctgtttcagg ctgtctatgt gtgactgttg 5700
agctgtaaca agttgtctca ggtgttcaat ttcattgttct agttgctttg ttttactggg 5760
ttcacctggt ctattagggtg ttacatgctg ttcattctgtt acattgtcga tctgttcgat 5820
gtgaacagct ttaaattgcac caaaaactcg taaaagctct gatgtatcta tcttttttac 5880
accgttttca tctgtgcata tggacagttt tccctttgat atctaacggg gaacagttgt 5940
tctacttttg tttgttagtc ttgatgcttc actgatagat acaagagcca taagaacctc 6000
agatccttcc gtatttagcc agtatgttct ctagtgtggg tcgttgtttt tgcgtgagcc 6060
atgagaacga accattgaga tcatgcttac tttgcatgtc actcaaaaat tttgectcaa 6120
aactggtgag ctgaattttt gcagttaaag catcgtgtag tgtttttctt agtccgttac 6180
gtaggtagga atctgatgta atgggtgttg gtattttgtc accattcatt tttatctggg 6240
tggtctcaag ttcgggttac agatccattt gtctatctag ttcaacttgg aaaatcaacg 6300
tatcagtcgg gcggcctcgc ttatcaacca ccaatttcat attgctgtaa gtgtttaaat 6360
ctttacttat tgggttcaaa accatttggg taagcctttt aaactcatgg tagttatttt 6420
caagcattaa catgaactta aattcatcaa ggctaactc catagagtat ttgttttcaa 6540
tcttttgtgt tagttctttt aataaccact cataaatcct catagagtat ttgttttcaa 6540
aagacttaac atgttccaga ttatatttta tgaatttttt taactggaaa agataaggca 6600
atatctcttc actaaaaact aattctaatt tttcgcttga gaacttggca tagtttgtcc 6660
actggaaaat ctcaaagcct ttaaccaaaag gattcctgat ttccacagtt ctgctcatca 6720
gctctctggg tgcttttagct aataaccat aagcattttc cctactgatg ttcattcatc 6780
gagcgtattg gttataagtg aacgataacc tccgttcttt ccttgtaggg ttttcaatcg 6840
tgggggttag tagtgccaca cagcataaaa tttagcttgg ttcatgctcc gtttaagtc 6900
agcgactaat cgctagtcca tttgctttga aaacaactaa ttcagacata catctcaatt 6960
gggtctaggtg attttaatca ctataccaat tgagatgggc tagtcaatga taattactag 7020
tccttttctt ttgagttgtg ggtatctgta aattctgcta gacctttgct ggaaaacttg 7080
taaattctgc tagacctct gtaaattccg ctgagacctt gtgtgttttt tttgtttata 7140
ttcaagtggg tataatttat agaataaaga aagaataaaa aaagataaaa agaataagatc 7200
ccagccctgt gtataactca ctacttttagt cagttccgca gtattacaaa aggatgtcgc 7260
aaacgctgtt tgctcctcta caaacagac cttaaaacc taaaggctta agtagcacc 7320
tcgcaagctc gggcaaactc ctgaatattc cttttgtctc cgaccatcag gcacctgagt 7380
cgatgtcttt tctgtgacat tcagttcgtc gcgtcacgg ctctggcagt gaatgggggt 7440
aaatggcact acaggcgcct tttatggatt cagcaagga aactacccat aatacaagaa 7500
aagcccgta cgggcttctc agggcggttt atggcggggtc tgctatgtgg tgctatctga 7560
ctttttgctg ttcagcagtt cctgccctct gattttccag tctgaccact tccgattatc 7620
ccgtgacagg tcattcagac tggctaattg acccagtaag gcagcggtat catcaacagg 7680
cttaccgctc ttaactgtcaa c

```

7701

&lt;210&gt; 26

&lt;211&gt; 3888

&lt;212&gt; DNA

&lt;213&gt; Artificial Sequence

&lt;220&gt;

&lt;223&gt; plasmid

&lt;400&gt; 26

```

tgcgcgcta cagggcgct ccattcgcca ttcaggctgc gcaactgttg ggaagggcga 60
tcgggtgggg cctcttctgt attacgccag tttgggggtg agttcatgaa gtttcgtcgc 120
agcggcagat tgggtgactt aacaaattat ttgttaaccc atccgcacga gttaataccg 180
ctaacccttt tctctgagcg gtatgaatct gcaaaatcat cgatcagtga agatttaaca 240

```

```

attattaaac aaacctttga acagcagggg attggtactt tgcttactgt tcccggagct 300
gccggaggcg ttaatatatat tccgaaaatg aagcaggctg aagctgaaga gtttgtgcag 360
acacttggac agtcgctggc aaatcctgag cgtatccttc cgggcgggta tgtatatatta 420
acggatatct taggaaagcc atctgtactc tocaaggtag ggaagctgtt tgcttccgtg 480
tttgagagc gcgaaattga tgttgtcatg accgttgcca cgaaaggcat cctcttgcg 540
tacgcagctg caagctatatt gaatgtgcct gttgtgacg ttcgtaaaga caataaggta 600
acagagggct ccacagtcag cattaattac gtttcaggct cctcaaaccg cattcaaaca 660
atgtcacttg cgaaaagaag catgaaaacg ggttcaaacc tactcattat tgatgacttt 720
atgaaagcag gcggcaccat taatgggtatg attaacctgt tggatgagtt taacgcaaat 780
gtggcgggaa tcggcgctctt agttgaagcc gaaggagtag atgaacgtct tgttgacgaa 840
tatatgtcac ttcttactct ttcaaccatc aacatgaaag agaagtccat tgaaattcag 900
aatggcaatt ttctgcgttt ttttaaagac aatcttttaa agaatggaga gacagaatca 960
tgacaaaagc agtccacaca aaacatgcc cagcggcaat cgggccttat tcacaaggga 1020
ttatcgtcaa caatatgttt tacagctcag gccaaatccc tttgactcct tcaggcgaaa 1080
tgggtgaatg cgatattaag gagcagactc atcaagtatt cagcaattta aaggcgggtt 1140
tggaagaagc ggggtgcttct tttgaaacag ttgtaaaagc aactgtatatt atcgcggtata 1200
tggaacagtt tgcggaagta aacgaagtgt acggacaata ttttgacact cacaaccgg 1260
cgagatcttg tgttgaagtc gcgagactcc cgaaggatgc gttagtcgag atcgaagtta 1320
ttgcactggt gaaataataa gaaaagtgat tctgggagag ccgggatcac ttttttattt 1380
accttatgcc cgaaatgaaa gctttatgac cctgcattaa tgaatcggcc aacgcgcggg 1440
gagaggcggt ttgcgtattg ggcgctcttc cgcttctctg ctactgact cgctgcgctc 1500
ggctgcttcg ttgcggcgag cgggtatcagc tcaactaaag gcggtaatac ggttatccac 1560
agaatcaggg gataacgcag gaaagaacat gtgagcaaaa ggccagcaaa aggcaggaa 1620
ccgtaaaaag gccgcgttgc tggcggtttt cgataggctc cgccccctg acgagcatca 1680
caaaaatcga cgctcaagtc agaggtggcg aaaccgcaca ggactataaa gataccaggc 1740
gtttcccccct ggaagctccc tcgtgcgctc tctgttccg accctgccgc ttaccggata 1800
cctgtccgcc tttctccctt cgggaagcgt ggcgctttct catagctcac gctgtaggta 1860
tctcagttcg gtgtaggtcg ttcgctccaa gctgggctgt gtgcacgaac ccccggttca 1920
gcccgaccgc tgcgccttat ccggttaacta tcgtcttgag tccaaccggg taagacacga 1980
cttatcgcca ctggcagcag ccactggtaa caggattagc agagcgagggt atgtaggcgg 2040
tgctacagag ttcttgaagt ggtggcctaa ctacggctac actagaagga cagtatttgg 2100
tatctgcgct ctgctgaagc cagttacctt cggaaaaga gttggtagct cttgatccgg 2160
caaacaaacc accgctggta gcggtggttt ttttgttgc aagcagcaga ttacgcagg 2220
aaaaaaagga tctcaagaag atcctttgat ottttctacg gggctctgacg ctacgtggaa 2280
cgaaaactca cgttaaggga ttttggatcat gagattatca aaaaggatct tcacctagat 2340
ccttttaaat taaaaatgaa gttttaaatc aatctaaagt atatatgagt aaacttggtc 2400
tgacagttac caatgcttaa tcagttaggc acctatctca gcgatctgtc tatttctgtc 2460
atccatagtt gcctgactcc ccgtcgtgta gataactacg atacgggagg gcttaccatc 2520
tggccccagt gctgcaatga taccgcgaga ccaacgctca ccggctccag atttatcagc 2580
aataaaccag ccagccggaa gggccgagcg cagaagtggg cctgcaactt tatccgcctc 2640
catccagttc attaatgttt gccgggaagc tagagtaagt agttcgccag ttaatagttt 2700
gcgcaacggt gttggcattg ctacaggcat cgtggtgtca cgctcgtcgt ttgggtaggc 2760
ttcattcagc tccggttccc aacgatcaag gcgagttaca tgatccccca tgttgtgcaa 2820
aaaagegggt agctccttcg gtccctccgat cgttgtcaga agtaagttgg ccgcagtgtt 2880
atcactcatg gttatggcag cactgcataa ttctcttact gtcatgccat ccgtaagatg 2940
cttttctgtg actggtgagt actcaaccaa gtcattctga gaataccgcg ccggcgacc 3000
gagttgctct tgcgccgctt caatacggga taatagtgtg tgacatagca gaactttaaa 3060
agtgtcatc atttgaaaac gttcttcggg gcgaaaactc tcaaggatct taccgctgtt 3120
gagatccagt tcgatgtaac ccactcgtgc acccaactga tcttcagcat cttttacttt 3180
caccagcgtt tctgggtgag caaaaacagg aagccaaaat gccgcaaaaa agggaataag 3240
ggcgacacgg aaatgttgaa tactcatact cttctttttt caatattatt gaagcattha 3300
tcagggttat tgtctcatga gcggatacat atttgaatgt atttagaaaa ataaacaaat 3360
aggggttccg cgcacatttc ccgaaaagt gccacctgta tgcggtgtga aataccgcac 3420
agatgcgtaa ggagaaaata ccgcatcagg cgaaattgta aacgttaata ttttgttaaa 3480
attcgcgtta aatatttgtt aaatcagctc attttttaac caataggccg aaatcggcaa 3540
aatcccttat aaatcaaaag aatagaccga gatagggttg agtgttgttc cagtttggaa 3600
caagagtcga ctattaaaga acgtggactc caacgtcaaa gggcgaaaaa ccgtctatca 3660
ggcgatggc ccactacgtg aaccatcacc caaatcaagt tttttgcggt cgagggtgcc 3720
taaagctcta aatcggaacc ctaaagggag cccccgattt agagcttgac ggggaaagcc 3780
ggcgaaacgt gcgagaaagg aagggaagaa agcgaaaagg gcggcgctga 3840
aagtgtagcg gtcacgctgc gcgtaaccac cacaccgcc gcgcttaa 3888

```

<210> 27  
 <211> 4606  
 <212> DNA  
 <213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: plasmid

<400> 27

```

tgcgccgcta cagggcgcggt ccattcgcca ttcaggctgc gcaactgttg ggaagggcga 60
tcggtgcggg cctcttcgct attacgccag ctggcgaaag ggggatgtgc tgcaaggcga 120
ttaagttggg taacgccagg gttttccag tcacgacgtt gtaaaacgac ggccagtgaa 180
ttgtaatacg actcactata gggcgacgtt gggccgacgt cgcattgctcc cggccgccat 240
ggccgcggga tgcggccgcg tcgacgtgaa ataccgcaca gatgcgtaag gagaaaatac 300
cgcattcaggc gataaaccca gcgaaccatt tgaggtgata ggtaagatta taccgaggta 360
tgaaaacgag aattggacct ttacagaatt actctatgaa gcgccatatt taaaaagcta 420
ccaagacgaa gaggatgaag aggatgagga ggcagattgc cttgaatata ttgacaatac 480
tgataagata atatatcttt tatatagaag atatcgccgt atgtaaggat ttcagggggc 540
aaggcatagg cagcgcgctt atcaatatat ctatagaatg ggcaaagcat aaaaacttgc 600
atggactaat gcttgaaccc caggacaata accttatagc ttgtaaattc tatcataatt 660
gtggtttcaa aatcggctcc gtcgatacta tgttatacgc caactttcaa aacaactttg 720
aaaaagctgt tttctgggat ttaaggtttt agaatgcaag gaacagtga tggagttcg 780
tcttggtata attagcttct tgggggtatc ttaaatactg tagaaaagag gaaggaaata 840
ataaatggct aaaatgagaa tatcaccgga attgaaaaaa ctgacgaaa aataccgctg 900
cgtaaaagat acggaaggaa tgtctcctgc taaggtatat aagctgggtg gagaaaatga 960
aaacctatat ttaaaaatga cggacagccg gtataaagg accacctatg atgtggaacg 1020
ggaaaaggac atgatgctat ggctggaagg aaagctgcct gttccaaagg tcctgcactt 1080
tgaacggcat gatggctgga gcaatctgct catgagttag gccgatggcg tcctttgctc 1140
ggaagagtat gaagatgaac aaagccctga aaagattatc gagctgtatg cggagtgcatt 1200
caggctcttt cactccatcg acatatcgga ttgtccctat acgaatagct tagacagccg 1260
cttagccgaa ttggattact tactgaataa cgacttgccc gatgtggatt gcgaaaactg 1320
ggaagaagac actccattta aagatccgcg cgactgtgat gattttttaa agacggaaaa 1380
gcccgaagag gaacttgtct tttcccacgg cgacctggga gacagcaaca tctttgtgaa 1440
agatggcaaa gtaagtggct ttattgatct tgggagaagc ggcagggcgg acaagtggta 1500
tgacattgcc ttctgcgtcc ggtcgatcag ggaggatata ggggaagaac agtatgtcga 1560
gctatttttt gaattactgg ggatcaagcc tgattgggag aaaataaaat atttatattt 1620
actggatgaa ttgttttagt acctagattt agatgtctaa aaagctttaa ctacaagctt 1680
tttagacatc taatcttttc tgaagtacat ccgcaactgt ccatactctg atgttttata 1740
tcttttctaa aagttcgcta gataggggtc ccgagcgctt acgaggaatt tgtatcgcca 1800
ttcgccattc aggtcgcgca actgtttgga agggcgatcg gtgcgggtac cgggatcaat 1860
agtgcggcgg cctgcaggtc gacctatagg gagagctccc aacgcgttgg atgcatagct 1920
tgagtattct atagtgtcac ctaaaatagct tggcgtaatc atggtcatag ctgtttcctg 1980
tgtgaaattg ttatccgctc acaattccac acaacatacg agccggaagc ataaagtgt 2040
aagcctgggg tgcctaata gtagagctaac tcacattaat tgcgttgccg tcaactgccc 2100
ctttccagtc gggaaacctg tcgtgccagc tgcattaatg aatcggccaa cgcgcgggga 2160
gaggcgggtt gcgtattggg cgctcttcgg cttectcgct cactgactcg ctgcgctcgg 2220
tcgttcggct gcggcgagcg gtatcagctc actcaaaggc ggtaatacgg ttatccacag 2280
aatcagggga taacgcagga aagaacatgt gagcaaaagg ccagcaaaag gccaggaacc 2340
gtaaaaaggc cgcgttgctg gcgtttttcg ataggctccg cccctctgac gagcatcaca 2400
aaaatcgacg ctcaagtcag aggtggcgaa acccgacagg actataaaga taccaggcgt 2460
ttccccctgg aagctccctc gtgcgctctc ctgtttccgac cctgcgctt accggatacc 2520
tgcccgctt tctcccttcg ggaagcgtgg cgctttctca tagctcacgc ttaggtatc 2580
tcagttcggt gtaggtcggt cgctccaagc tgggctgtgt gcacgaacco cccgttcagc 2640
ccgaccgctg cgccttatcc ggtaactatc gtcttgagtc caaccgggta agacacgact 2700
tatcgccact ggcagcagcc actggtaaca ggattagcag agcgaggtat gtaggcgggtg 2760
ctacagagtt cttgaagtgg tggectaact acggctacac tagaaggaca gtatttggt 2820
tctgcgctct gctgaagcca gttaccttcg gaaaaagagt tggtagctct tgatccggca 2880
aacaaccac cgcgtgtagc ggtgggtttt ttgtttgcaa gcagcagatt acgcgcagaa 2940
aaaaaggatc tcaagaagat cttttgatct tttctacggg gtctgacgct cagtggaaacg 3000
aaaactcacg ttaagggatt ttggtcatga gattatcaaa aaggatcttc acctagatcc 3060

```

```

ttttaaatta aaaatgaagt tttaaatcaa tctaaagtat atatgagtaa acttgggtctg 3120
acagttacca atgcttaatc agtgaggcac ctatctcagc gatctgtcta tttcgttcat 3180
ccatagttgc ctgactcccc gtctgttaga taactacgat acgggagggc ttaccatctg 3240
gccccagtg tgcaatgata ccgcgagacc cacgtccacc ggctccagat ttatcagcaa 3300
taaaccagcc agccggaagg gccgagcgca gaagtgggtc tgcaacttta tccgcctcca 3360
tccagtctat taattgttgc cgggaagcta gagtaagtag ttcgccagtt aatagtttgc 3420
gcaacgttgt tggcattgtc acaggcatcg tgggtgcacg ctctcgtttt ggtatggctt 3480
cattcagctc cggttcccaa cgatcaaggc gagttacatg atcccccatg ttgtgcaaaa 3540
aagcggtag ctcttcggt cctccgatcg ttgtcagaag taagttggcc gcagtgttat 3600
cactcatggt tatggcagca ctgcataatt ctcttactgt catgccatcc gtaagatgct 3660
tttctgtgac tgggtgagtac tcaaccaagt cattctgaga ataccgcgcc cggcgaccga 3720
gttgcctctt cccggcgcta atacgggata atagtgtatg acatagcaga actttaaaag 3780
tgctcatcat tggaaaacgt tcttcggggc gaaaactctc aaggatctta ccgctgttga 3840
gatccagttc gatgtaaccc actcgtgcac ccaactgatc ttcagcatct tttactttca 3900
ccagcgttcc tgggtgagca aaaacaggaa ggcaaaatgc cgcaaaaaag ggaataaggg 3960
cgacacggaa atgttgaata ctcatactct tcctttttca atattattga agcatttacc 4020
agggttattg tctcatgagc ggatacatat ttgaatgtat ttagaaaaat aaacaaatag 4080
gggttccgca cacatttccc cgaaaagtgc cacctgtatg cgggtgtgaaa taccgcacag 4140
atgcgtaagg agaaaatacc gcatcaggcg aaattgtaaa cgtaaatatt ttgttaaaat 4200
tcgcgttaaa tatttgttaa atcagctcat tttttaacca ataggccgaa atcggcaaaa 4260
tcccttataa atcaaaagaa tagaccgaga taggggtgag tgttgttcca gtttgaaca 4320
agagtccact attaaagaac gtggactcca acgtcaaagg gcgaaaaacc gtctatcagg 4380
gcgatggccc actacgtgaa ccatcaccca aatcaagttt tttgcggtcg aggtgccgta 4440
aagctcataa tcggaaccct aaaggagacc cccgatttag agcttgacgg ggaaagccgg 4500
cgaacgtggc gagaaaggaa ggggaagaaag cgaaaggagc gggcgctagg gcgctggcaa 4560
gtgtagcggc cacgtgcgc gtaaccacca caccgcgcgc gcttaa 4606

```

&lt;210&gt; 28

&lt;211&gt; 5399

&lt;212&gt; DNA

&lt;213&gt; Artificial Sequence

&lt;220&gt;

&lt;223&gt; Description of Artificial Sequence: plasmid

&lt;400&gt; 28

```

tgcgcgcta cagggcgct ccattcgcca ttcaggctgc gcaactgttg ggaagggcga 60
tcggtgcggg cctcttcgct attacgccag tttgggggtg agttcatgaa gtttcgtcgc 120
agcggcagat tgggtggactt aacaaattat ttgttaaccc atccgcacga gtaaataccg 180
ctaacctttt tctctgagcg gtatgaatct gcaaaatcat cgatcagtga agatttaaca 240
attattaac aaacctttga acagcagggg attggtactt tgcttactgt tcccggagct 300
gccggaggcg ttaaatatat tccgaaaatg aagcaggtg aagctgaaga gtttgtgcag 360
acacttggac agtcgctggc aaatcctgag cgtatccttc cgggcgggta tgtatattta 420
acggatatct taggaaagcc atctgtactc tccaaggtag ggaagctggt tgcttccgtg 480
tttgcagagc gcgaaattga tgttgtcatg accgttgcca egaaaggcat ccctcttgcg 540
tacgcagctg cggccgcgct gacaaaccga gtgaaccatt tgaggtgata ggtaagatta 600
taccgaggta tgaaaacgag aattggacct ttacagaatt actctatgaa gcgccatatt 660
taaaaagcta ccaagacgaa gaggatgaag aggatgagga ggcagattgc cttgaatata 720
ttgacaatac tgataagata atatattctt tatatagaag atatcgccgt atgtaaggat 780
ttcagggggc aaggcatagg cagcgcgctt atcaatatat ctatagaatg ggcaaaagcat 840
aaaaacttgc atggactaat gcttgaaacc caggacaata acctatagc ttgtaaattc 900
tatcataatt gtggtttcaa aatcggctcc gtcgatacta tgttatacgc caactttcaa 960
aacaactttg aaaaagctgt tttctgggat ttaagggttt agaattgcaag gaacagtga 1020
ttggagttcg tcttgttata attagcttct tgggggtatc ttaaatactg tagaaaagag 1080
gaaggaaata ataatggct aaaatgagaa tatcaccgga attgaaaaaa ctgatcgaaa 1140
aataccgctg cgtaaaagat acggaaggaa tgtctcctgc taaggatat aagctgggtg 1200
gagaaaatga aaacctatat ttaaaaatga cggacagccg gtataaagg accacctatg 1260
atgtggaacg ggaaaaggac atgatgctat ggctggaagg aaagctgcct gttccaaagg 1320
tcctgcaett tgaacggcat gatggctgga gcaatctgct catgagttag gccgatggcg 1380
tcctttgctc ggaagagtat gaagatgaac aaagccctga aaagattatc gagctgtatg 1440
cggagtgcac caggctcttt cactccatcg acatatcgga ttgtccctat acgaatagct 1500

```

tagacagccg	cttagccgaa	ttggattact	tactgaataa	cgatctggcc	gatgtggatt	1560
gcgaaaactg	ggaagaagac	actccattta	aagatccgcg	cgagctgtat	gatttttttaa	1620
agacggaaaa	gcccgaagag	gaacttgctt	tttcccacgg	cgacctggga	gacagcaaca	1680
tctttgtgaa	agatggcaaa	gtaagtggct	ttattgatct	tgggagaagc	ggcagggcgg	1740
acaagtggta	tgacattgcc	ttctgcgtcc	ggtcgatcag	ggaggatata	ggggaagaac	1800
agtatgtcga	gctatttttt	gacttactgg	ggatcaagcc	tgattgggag	aaaataaaat	1860
attatatttt	actggatgaa	ttgttttagt	acctagattt	agatgtctaa	aaagctttta	1920
ctacaagctt	tttagacatc	taatcttttc	tgaagtacat	ccgcaactgt	ccatactctg	1980
atgttttata	tctttttctaa	aagtctcgta	gataggggtc	ccgagcgcc	acgaggaatt	2040
tgtatcacca	ggtaccagct	gcaagctatt	tgaatgtgcc	tggtgtgatc	gttcgtaaa	2100
acaataaggt	aacagagggc	tccacagtca	gcattaatta	cgtttcaggc	tcctcaaacc	2160
gcattcaaac	aatgtcactt	gcgaaaagaa	gcatgaaaac	gggttcaaac	gtactcatta	2220
ttgatgactt	tatgaaagca	ggcggcacca	ttaatgggat	gattaacctg	ttggatgagt	2280
ttaacgcaaa	tgtggcggga	atcggcgtct	tagttgaagc	cgaaggagta	gatgaacgtc	2340
ttgttgacga	atatatgtca	cttcttactc	tttcaaccat	caacatgaaa	gagaagtcca	2400
ttgaaattca	gaatggcaat	tttctgcgtt	tttttaaaga	caatctttta	aagaatggag	2460
agacagaatc	atgacaaaag	cagtcacac	aaaacatgcc	ccagcggcaa	tcgggcctta	2520
ttcacaaggg	attatcgta	acaatatgtt	ttacagctca	ggccaaatcc	ctttgactcc	2580
ttcaggcgaa	atgggtgaatg	gcgatattaa	ggagcagact	catcaagtat	tcagcaattt	2640
aaaggcgggt	ctggaagaag	cgggtgcttc	ttttgaaaca	gttgtaaaag	caactgtatt	2700
tatcgcggt	atggaacagt	ttgcggaagt	aaacgaagt	tacggacaat	attttgacac	2760
tcacaaaccg	gcgagatctt	gtgttggaag	cgcgagactc	ccgaaggatg	cgtagtcga	2820
gatcgaaagt	attgcactgg	tgaaataata	agaaaagtga	ttctgggaga	gccgggatca	2880
cttttttatt	taccttatgc	ccgaaatgaa	agctttatga	ccctgcatta	atgaatcggc	2940
caacgcgcgg	ggagaggcgg	tttgcgtatt	gggcgtctct	ccgttctctc	getcaetgac	3000
tcgctgcgct	cggctgctcg	getgcggcga	gcggtatcag	ctcactcaaa	ggcggaata	3060
cggttatcca	cagaatcagg	ggataacgca	ggaaagaaca	tgtgagcaaa	aggccagcaa	3120
aaggccagga	accgtaaaaa	ggccgcgctg	ctggcgctttt	tcgataggct	ccgccccct	3180
gacgagcatc	acaaaaatcg	acgctcaagt	cagaggtggc	gaaacccgac	aggactataa	3240
agataccagg	cgtttcccc	tggaaagctcc	ctcgtgcgct	ctcctgttcc	gacctgtccg	3300
cttaccggat	acctgtccgc	ctttctccct	tcgggaagcg	tggcgctttc	tcatagctca	3360
cgctgtagg	atctcagttc	ggtgtaggtc	gttcgctcca	agctgggctg	tgtgcacgaa	3420
cccccgcttc	agcccgaccg	ctgcgcctta	tcgggtaact	atcgtcttga	gtccaaccgc	3480
gtaagacacg	acttatcgcc	actggcagca	gccactggta	acaggattag	cagagcgagg	3540
tatgtaggcg	gtgctacaga	gttcttgaag	tgggtggccta	actacggcta	cactagaagg	3600
acagtatttg	gtatctgcgc	tctgctgaag	ccagttacct	tcggaaaaag	agttggtagc	3660
tcttgatccg	gcaaacaaac	caccgctggg	agcgggtgggt	tttttggttg	caagcagcag	3720
attacgcgca	gaaaaaaagg	atctcaagaa	gaccccttga	tcttttctac	ggggtctgac	3780
gctcagtgg	acgaaaactc	acgttaaggg	attttgggtca	tgagattatc	aaaaaggatc	3840
ttcacctaga	tcctttttaa	ttaaaaatga	agtttttaaat	caatctaaag	tatatatgag	3900
taaacttggt	ctgacagtta	ccaatgctta	atcagtggag	cacctatctc	agcgatctgt	3960
ctatttcgtt	catccatagt	tgctgactc	ccgctcgtgt	agataactac	gatacgggag	4020
ggcttaccat	ctggccccag	tgctgcaatg	ataccgcgag	acccacgctc	acgggtcca	4080
gatttatcag	caataaacca	gccagccgga	agggccgagc	gcagaagtgg	tcctgcaact	4140
ttatccgctt	ccatccagtc	tattaattgt	tgccgggaag	ctagagtaag	tagttcgcca	4200
gttaatatgt	tgcgcaacgt	tggtggcatt	gctacaggca	tcgtgggtgc	acgctcgtcg	4260
tttggtatgg	cttcatteag	ctccggttcc	caacgatcaa	ggcgagttac	atgatcccc	4320
atgttggtgca	aaaaagecgt	tagctccttc	ggtcctccga	tcgttggtcag	aagtaagttg	4380
gccgcagtgt	tatcactcat	ggttatggca	gcactgcata	attctcttac	tgtcatgcca	4440
tccgtaagat	gcttttctgt	gactgggtgag	tactcaacca	agtcattctg	agaataccgc	4500
gcccggcgac	cgagttgtct	ttgcccggcg	tcaatacggg	ataatagtgt	atgacatagc	4560
agaactttta	aagtgtctat	cattggaaaa	cgttcttcgg	ggcgaaaact	ctcaaggatc	4620
ttaccgctgt	tgagatccag	ttcgatgtaa	cccactcgtg	cacccaactg	atcttcagca	4680
tcttttactt	tcaccagcgt	ttctgggtga	gcaaaaacag	gaaggcaaaa	tgccgcaaaa	4740
aagggaataa	ggcgacacag	gaaatgttga	atactcatac	tcttcttttt	tcaatattat	4800
tgaagcattt	atcagggtta	ttgtctcatg	agcggatata	tatttgaatg	tatttagaaa	4860
aataaacaaa	taggggttcc	gcgcaeat	ccccgaaaag	tgccacctgt	atgcggtgtg	4920
aaataccgca	cagatgcgta	aggagaaaat	accgcatacag	gcgaaattgt	aaacgttaat	4980
attttggtta	aattcgcgtt	aaatatttgt	taaatcagct	cattttttta	ccaataggcc	5040
gaaatcggca	aaatccctta	taaatcaaaa	gaatagaccg	agataggggt	gagtggtgtt	5100
ccagtttgga	acaagagtc	actattaaag	aacgtggact	ccaacgtcaa	agggcgaaaa	5160



accgtctatc agggcgatgg ccactacgt gaaccatcac ccaaatacaag ttttttgagg 5220  
 tcgaggtgcc gtaaagctct aaatcggaac cctaaaggga gccccgatt tagagcttga 5280  
 cggggaaagc cggcgaaacgt ggcgagaaag gaagggaaga aagcgaaagg agcgggagct 5340  
 agggcgctgg caagtgtagc ggtcacgctg cgcgtaacca ccacacccgc cgcgcttaa 5399

<210> 29

<211> 6805

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: plasmid

<400> 29

ttgcggccgc ttcgaaagct gtaatatataa aaccttcttc aactaacggg gcaggttagt 60  
 gacattagaa aaccgactgt aaaaagtaca gtcggcatta tctcatatta taaaagccag 120  
 tcattaggcc tatctgacaa ttcctgaata gagttcataa acaatcctgc atgataacca 180  
 tcacaaacag aatgatgtac ctgtaaagat agcggtaaat atattgaatt acctttatta 240  
 atgaattttc ctgctgtaat aatgggtaga aggttaattac tattattatt gatatttaag 300  
 ttaaacccag taaatgaagt ccatggaata atagaaagag aaaaagcatt ttcagggtata 360  
 ggtgttttgg gaaacaattt ccccgaaaca ttatatctct ctacatcaga aagggtataaa 420  
 tcataaaact ctttgaagtc attctttaca ggagtccaaa taccagagaa tgttttagat 480  
 acaccatcaa aaattgtata aagtggctct aacttatccc aataacctaa ctctccgctg 540  
 ctattgtaac cagttctaaa agctgtattt gagtttatca cccttgctac taagaaaata 600  
 aatgcagggt aaaatttata tccttcttgt tttatgtttc ggtataaaac actaatatca 660  
 atttctgtgg ttatactaaa agtcgtttgt tgggtcaaat aatgattaaa tatctctttt 720  
 ctcttccaat tgtctaaatc aattttatta aagttcattt gatatgcctc ctaaaatttt 780  
 atctaaagtg aatttaggag gcttacttgt ctgctttctt cattagaatc aatccttttt 840  
 taaaagtcaa tattactgta acataaatat atattttaaa aatatccac tttatccaat 900  
 tttcgtttgt tgaactaatg ggtgctttag ttgaagaata aagaccacat taaaaaatgt 960  
 ggtcttttgt gtttttttaa aggatttgag cgtagcgaaa aatccttttc tttcttatct 1020  
 tgataataag ggttaactatt gaattcggta ccaagagttt gtagaaacgc aaaaaggcca 1080  
 tccgtcagga tggccttctg cttaatttga tgcctggcag tttatggcgg gcgtcctgcc 1140  
 cgcaccctc cgggcggtg cttcgcaacg ttcaaatccg ctcccgccg atttgctcta 1200  
 ctccaggagag cgttcaccga caaacaacag ataaaacgaa aggccagtc tttcgatga 1260  
 gcctttcgtt ttatttgatg cctggcagtt cctactctc gcatggggag accccacact 1320  
 accatcgccg ctacggcggt tcacttctga gttcggcatg gggtcagggt ggaccaccgc 1380  
 gctactgccg ccaggcaaat tctgttttat cagaccgctt ctgcgttctg atttaactctg 1440  
 tatcaggctg aaaatcttct ctcatccgcc aaacaggat ccaattatgg cagatcaatg 1500  
 agcttcacag acacaatatc agggacattt gttagttctt tcacaatttt atcttccaga 1560  
 tgtctgtcaa aggaaagcat catgatggct tctccgcctt tttccttacg gccaacctgc 1620  
 atagtgtcaa tgtaatatc attatctcgg agaatacgtc ctactcggcc gatgacacct 1680  
 gttgtatctt gatgtggat atacaccaag tgaccagtcg gataaaaatc aatattaat 1740  
 ccattgatct cgacaattcg ttctccgaaa tgaggaatat acgtagcgt tacagtaaaag 1800  
 gtgctgcggg ctctgtcac ttttacgctg atgcagttat cgtatccaga ttcagaagag 1860  
 gaaatttttt cactgaagct aatgccgcgt tcttttgoga cccccccgc attgacctca 1920  
 ttaacagtag agtctacgcg cggtttttaa aagcctgaca gaagggttt tgtaatgaac 1980  
 gatgtttcaa gtttagcaat tgtgccttca tattgaatgg caacatcctg tactggttct 2040  
 ttcatgcact gtgatacaag gctgccaatt tttcctgcaa tttgatggtg aggccttaatt 2100  
 ttagcaaatt catcttttgt catggcaggc aggttgatag ctgacatgac aggcaggcct 2160  
 tttgcgaact gcagaacttc ttctgacact tgggcggcga cattgagctg tgcttctttc 2220  
 gttgatgctc ccaagtggag agtggcaatg actaatggat gatcaacaag tttgttgtea 2280  
 actggcgggt cgaactcgaa aacgtcaagc gctgctcccg caacatgccc gttttccaaa 2340  
 gcttcgagaa gtgctgcttc atcgataatt ccgcctccgc cacagttaat taagcgaacg 2400  
 ccttttttcg tttttgcaat cgtttcttta ttcaataagc cttttgtttc ttttgtaaaa 2460  
 ggcgtgtgaa cggtaatgat atccgcactt tcaagcactt cttcaaatgt acggctgttt 2520  
 acgccgattt ttttcgctct ttcttccggt aagaaaggat caaaaacgtg cacagtcata 2580  
 ccgaacgctc ctgcagctg tgcaatttca cttccgattc ggcctaatec tacaatacca 2640  
 agcgtttttc cataaagctc tgaaccgaca taagctgtgc ggttccactc tctggatttc 2700  
 actgagatat tagcctgcgg aatgtgtctc attaaagaag agatcattgc aaatgtatgc 2760  
 tcagctgtcg aaatgggtgt gccgttcgga gcattgatca cgattacccc gtgtttccta 2820



gcctcatcaa tatcgatatt atcgacaccg acaccggctc ttccgacaat ttttaaagaa 2880  
 gtcattttgt tgaaaagggtc ttctgttact tttgtcgcgc ttccgaccaaa aagagcatca 2940  
 aaagtatgta attcatcttc tgcattctgct acgttttttt gaacgatttc aataaagtct 3000  
 gattcaataa gtggctgtaa accgtcggtg ctcatcttct ctgagaccaaa tactcgaaac 3060  
 atgttttctc ctctcttaga gcgtcctgct gttgttaaga ttattatacc acaccttgta 3120  
 gataaagtca acaacttttt gcaaaatttt tcaggaattt tagcagaggt tgttctggat 3180  
 gtagaacaaa acatctttcc gctcttgctc tgtaggata tctttcttgg aagctaggta 3240  
 ggctcgagt tatggcagtt ggttaaaagg aaacaaaaag accgttttca cacaaaacgg 3300  
 tctttttcga tttcttttta cagtcacagc cacttttgca aaaaccggac agcttcatgc 3360  
 cttataactg ctgtttcggg cgacctgcag gcatgcaagc ttccgcaagc ggccgcccag 3420  
 gcgaggctgg atggccttcc ccattatgat tcttctcgct tccggcggca tcgggatgcc 3480  
 cgcgttgtag gccatgctgt ccaggcaggt agatgacgac catcaggagc agcttcaagg 3540  
 atcgctcgcg gctcttacca gcctaacttc gatcactgga ccgctgatcg tcacggcgat 3600  
 ttatgcgcgc tcggcgagca catggaacgg gttggcatgg attgtaggcg ccgccctata 3660  
 ccttgctcgc ctcccgcgt tgcgtcgcg tgcattggagc cgggccacct cgacctgaat 3720  
 ggaagccggc ggcacctcgc taacggatcc accactccaa gaattggagc caatcaattc 3780  
 ttgaggagaa ctgtgaatgc gcaaaccaac ccttgccaga acatatccat cgcgtccgcc 3840  
 atctccagca gccgcacgcg gcgcattctc ggccagcgtt ggtcctggcc acgggtgcgc 3900  
 atgatcgtgc tectgtcgtt gaggaccgcg ctaggctggc ggggttgctt tactggttag 3960  
 cagaatgaat caccgatacg cgagcgaacg tgaagcgact gctgctgcaa aacgtctgcg 4020  
 acctgagcaa caacatgaat ggtcttcggt ttccgtgttt cgtaaagtct ggaaacgcgg 4080  
 aagtcagcgc cctgcacat tatgttccgg atctgcatcg caggatgctg ctggctaccc 4140  
 tgtggaacac ctacatctgt attaacgaag cgctggcatt gacctgagt gatttttctc 4200  
 tggctccgcc gcattccat cgccagttgt ttaccctcac aacgttccag taaccgggca 4260  
 tgttcatcat cagtaaccgc tatcgtgagc atctctctc gtttcatcgg tatcattacc 4320  
 cccatgaaca gaaattcccc cttacagcga ggcattcaagt gaccaaacag gaaaaaacgc 4380  
 ccttaacat ggccgcgttt atcagaagcc agacattaac gcttctggag aaactcaacg 4440  
 agctggacgc ggatgaacag gcagacatct gtgaatcgct tcacgaccac gctgatgagc 4500  
 ttaccgcag ctgcctcgcg cgtttcgggt atgacgggtg aaacctctga cacatgcagc 4560  
 tccggagac ggtcacagct tgtctgtaag cggatgccgg gagcagacaa gcccgtcagg 4620  
 gcgcgtcagc ggggtgttggc ggggtgtcggg gcgcagccat gaccagtea cgtagcgata 4680  
 gcggagtgt tactggctta actatgcggc atcagagcag attgtactga gagtgcacca 4740  
 tatgcggtgt gaaataccgc acagatgcgt aaggagaaaa taccgcatca ggcgtctctc 4800  
 cgcttctcgc ctactgact cgctgcgctc ggtcgttcgg ctgcggcgag cggtatcagc 4860  
 tcaactaaag gcggtaatat gggtatccac agaactcagg gataacgcag gaaagaacat 4920  
 gtgagcaaaa ggccagcaaa aggccaggaa ccgtaaaaag gccgcgttgc tggcggtttt 4980  
 ccataggctc cgccccctg acgagcatca caaaaatcga cgctcaagtc agaggtggcg 5040  
 aaaccgcaca ggactataaa gataccaggc gtttccccct ggaagctccc tcgtgcgctc 5100  
 tctgttccg accctgcgcg gctgtaggta tctcagttcg gtgtaggtcg ttcgctccaa 5220  
 ggcgctttct catagctcac ccccggttca gcccgaccgc tgcgccttat ccggttaacta 5280  
 gctgggtgtg ttccaaacgg taagaacga cttatcgcca ctggcagcag ccactggtaa 5340  
 tegtcttgag tgcgaacgg atgtaggcg tgctacagag ttcttgaagt ggtggcctaa 5400  
 caggattagc actagaagga cagtatttgg tatctgcgct ctgetgaagc cagttacctt 5460  
 ctacggctac gttggtagct cttgatccgg caaacaacc accgctggtg gcggtggttt 5520  
 cggaaaaaga aagcagcaga ttacgcgcag aaaaaaagga tctcaagaag atcctttgat 5580  
 ttttctacg ggggtctgag ctcatgtgaa cgaaaactca cgttaaggga ttttgggtcat 5640  
 gagattatca aaaaggatct tcacctagat ccttttaaat taaaaatgaa gttttaaatc 5700  
 aatctaaagt atatatgagt aaacttggtc tgacagttac caatgcttaa tcagtggagc 5760  
 acctatctca gcgatctgtc tatttctgtc atccatagtt gcctgactcc ccgtcgtgta 5820  
 gataactacg atacgggagg gcttaccatc tggccccagt gctgcaatga taccgcgaga 5880  
 cccacgtca ccggctccag atttatcagc aataaaccag ccagccggaa gggccgagcg 5940  
 cagaagtggc cctgcaactt tatccgcctc catccagctc attaatgtt gccgggaagc 6000  
 tagagtaagt agttcgccag ttaatagttt gcgcaacgtt gttgccattg ctgcaggcat 6060  
 cgtgggtgca cgctcgtcgt ttgggtatggc ttcatcagc tccggttccc aacgatcaag 6120  
 gcgagttaca tgatccccca tgggttgcaa aaaageggtt agctccttcg gtcctccgat 6180  
 cgttgctcaga agtaagttgg ccgcagtggt atcactcatg gttatggcag cactgcataa 6240  
 ttctcttact gtcatgccat ccgtaagatg cttttctgtg actgggtgagt actcaaccaa 6300  
 gtcattctga gaatagtgt tgcggcgacc gaggttgctc tgcccggcgt caatacggga 6360  
 taataccgcg ccacatagca gaactttaaa agtgctcatc attggaaaac gttcttcggg 6420  
 gcgaaaactc tcaaggatct taccgctggt gagatccagt tcgatgtaac ccactcgtgc 6480

```

acccaactga tcttcagcat cttttacttt caccagcggt tctgggtgag caaaaacagg 6540
aaggcaaaat gccgcaaaaa agggaataag ggcgacacgg aaatgttgaa tactcatact 6600
cttccttttt caatattatt gaagcattta tcagggttat tgtctcatga gcggatacat 6660
atttgaatgt atttagaaaa ataaacaaat aggggttccg cgcacatttc cccgaaaagt 6720
gccacctgac gtctaagaaa ccattattat catgacatta acctataaaa ataggcggtat 6780
cacgaggccc tttcgtcttc aagaa                                     6805

```

&lt;210&gt; 30

&lt;211&gt; 5983

&lt;212&gt; DNA

&lt;213&gt; Artificial Sequence

&lt;220&gt;

&lt;223&gt; Description of Artificial Sequence: plasmid

&lt;400&gt; 30

```

tgcgccccta cagggcgcggt ccattcgcca ttcaggctgc gcaactgttg ggaaggcgca 60
tcgggtgcggg cctcttcgct attacgccag ctggcgaaag ggggatgtgc tgcaaggcga 120
ttaagttggg taacgccagg gttttcccag tcacgacgtt gtaaaacgac ggccagtga 180
ttgtaatacg actcactata gggcggaattg ggcccgacgt cgcattgctcc cggccgcat 240
ggccgcggga tatcactagt gggcgccgct gcaggctgac catatgggag agcccggtat 300
caattatggc agatcaatga gcttcacaga cacaatatca gggacatttg ttagttcttt 360
cacaatttta tcttcagat gtctgtcaaa ggaaagcatc atgatggctt ctccgccttt 420
ttccttacgg ccaacctgca tagttgcaat gttaatatca ttatctccga gaatacgtcc 480
tactcggccg atgacacctg ttgtatcttg atgctggata tacaccaagt gaccagtcgg 540
ataaaaatca atattaaatc cattgatctc gacaattcgt tctccgaaat gaggaatata 600
cgtagccgtt acagtaaagg tgctgcggtc tctgtcact tttacgtga tgcagttatc 660
gtatccagat tcagaagagg aaattttttc actgaagcta atgcccggtt cttttgcgac 720
acccccggca ttgacctcat taacagtaga gtctacgcgc ggttttaaaa agcctgacag 780
aagggttttt gtaatgaacg atgtttcaag tttagcaatt gtgccttcac attgaatggc 840
aacatcctgt actggttctt tcatgcactg tgatacaagg ctgccaatth ttctgcaat 900
ttgatggtaa ggcttaattt tagcaaatc atcttttgtc atggcaggca ggttgatagc 960
tgacatgaca ggcaggcctt ttgcgaactg cagaacttct tctgacactt gggcggcgac 1020
attgagctgt gcttctttcg ttgatgctcc caagtgagga gtggcaatga ctaatggatg 1080
atcaacaagt ttgttgtcaa ctggcggttc gacttcgaaa acgtcaagcg ctgctcccgc 1140
aacatgcccg ttttcgaaag ctttttagac atctaaatct aggtactaaa acaattcatc 1200
cagtaaaata taatatttta tttctccca atcaggcttg atccccagta agtcaaaaaa 1260
tagctcgaca tactgttctt ccccgatatc ctccctgatc gaccggacgc agaaggcaat 1320
gtcataccac ttgtccgccc tgccgcttct cccaagatca ataaagccac ttactttgcc 1380
atctttcaca aagatgttgc tgtctcccag gtgcgcgttg gaaaagacaa gttcctcttc 1440
ggggttttcc gtctttaaa aatcatacag ctgcgcggga tctttaaatg gagtgtcttc 1500
ttcccgattt tcgcaatcca catcgccag atcgttatct agtaagtaat ccaattcggc 1560
taagcggctg tctaagctat tegtatagg acaatccgat atgtcgatgg agtgaaagag 1620
cctgatgcac tccgcataca gctcgataat cttttcaggg ctttgttcat cttcatactc 1680
ttccgagcaa aggacgcat cgccctcact catgagcaga ttgctccagc catcatgccg 1740
ttcaaagtgc aggacctttg gaacaggcag ctttccttcc agccatagca tcatgtcctt 1800
ttcccgcttc acatcatagg tggctccctt ataccggctg tccgtcattt ttaaatatag 1860
gttttcattt tctccacca gcttatatac cttagcagga gacattcctt cgtatcttt 1920
tacgcagcgg tatttttcca tcagtttttt caattccggt gatattctca ttttagccat 1980
ttattatttc cttcctcttt tctacagtat ttaaagatac cccaagaagc taattataac 2040
aagacgaact ccaattcact gttccttga ttctaaaacc ttaaatacca gaaaacagct 2100
ttttcaaagt tgttttgaaa gttggcgat aacatagtat cgacggagcc gattttgaaa 2160
ccacaattat gatagaattt acaagctata aggttattgt cctgggtttc aagcattagt 2220
ccatgcaagt ttttatgctt tgcccattct atagatatat tgataagcgc gctgcctatg 2280
ccttgcccc tgaaatcctt acatacggcg atatcttcta tataaaagat atattatctt 2340
atcagtattg tcaatatatt caaggcaatc tgccctctca tctcttcat cctcttcgtc 2400
ttggtagctt tttaaatatg gcgcttcata gagtaattct gtaaaggctc aattctcggt 2460
ttcatacctc ggtataatct tacctatcac ctcaaagggt tcgctgggtt tatcgccgtg 2520
tgcggtattt tctccttacg catctgtgcg gtatttcacg tcgacgcggc cgccatggcc 2580
gcgggatccc ggtaccgaaa catcgtaga tttcctcta aattgacaaa ctaaatatct 2640

```

gataatttaa catattctca aaagagtgtc aacgtgtatt gacgcagtaa aggataaaaag 2700  
 taaagcctaa taaatcaatg atctgacagc ttgcaggtaa tatatttaat ttgaagcaat 2760  
 tctctataca gcccaaccagt tatcgtttat aatgtaatta aatttcatat gatcaatctt 2820  
 cggggcaggg tgaaattccc taocggcggt gatgagccaa tggctctaag cccgcgagct 2880  
 gtctttacag caggattcgg tgagattccg gagccgacag tacagtctgg atggggagaag 2940  
 atggagggtc ataagcggtt tgaaattgaa tttttcaaac gtttctttgc ctagcctaata 3000  
 tttcgaaacc ccgcttttat atatgaagcg gtttttttat tggctggaaa agaacctttc 3060  
 cgttttcgag taagatgtga tcgaaaagga gagaatgaag tgaaagtaaa aaaattagtt 3120  
 gtggtcagca tgctgagcag cattgcattt gttttgatgc tgttaaattt cccgtttccg 3180  
 ggtcttccgg attattttaa aatcgatttt agcgacgttc ccgcaattat tgccattctg 3240  
 atttacggac ctttggcggg atcactagag ggctcccaac gcgttggtat catagcttga 3300  
 gtattctata gtgtcaccta aatagcttgg cgtaatcatg gtcatactgt tttctgtgt 3360  
 gaaattgtta tccgctcaca attccacaca acatacgagc cggaagcata aagtgtaaag 3420  
 cctggggtgc ctaatgagtg agctaactca cattaattgc gttgcgctca ctgcccgtt 3480  
 tccagtcggg aaacctgtcg tgccagctgc attaatgaat cggccaacgc gcggggagag 3540  
 gcggtttgcg tattggcggt tcttcgctt cctcgctcac tgactcgctg cgctcggtcg 3600  
 ttccggtcgc gcgagcggt ttagctcact caaaggcggt aatacgggtt tccacagaat 3660  
 caggggataa cgcaggaaag aacatgtgag caaaaggcca gcaaaaggcc aggaaccgta 3720  
 aaaaggccgc gttgctggcg tttttcgata ggctccgccc cctgacgag catcacaaaa 3780  
 atcgacgtc aagtcagagg tggcgaaacc cgacaggact ataaagatac caggcgtttc 3840  
 cccctggaag ctccctcgtg cgctctctg ttcgaccct gccgcttacc ggatacctgt 3900  
 ccgctttct ccttcggga agcgtggcg tttctcatag ctacgctgt aggtatctca 3960  
 gttcgggtga ggtcgttcgc tccaagctgg gctgtgtgca cgaaccccc gttagcccg 4020  
 accgctgcgc cttatccggt aactatcgtc ttgagtccaa cccggttaaga cagcattat 4080  
 ccgactggc agcagccact ggtaacagga ttagcagagc gaggtatgta ggcggtgcta 4140  
 cagagttctt gaagtgtggt cctaactacg gctacactag aaggacagta tttggtatct 4200  
 gcgctctgct gaagccagtt accttcggaa aaagagttgg tagctcttga tccggcaaac 4260  
 aaaccaccgc tggtagcggg ggtttttttg tttgcaagca gcagattacg cgcagaaaaa 4320  
 aaggatctca agaagatcct ttgatcttt ctacggggtc tgacgctcag tggaaacgaa 4380  
 actcacgtta agggattttg gtcattgagat tatcaaaaag gatcttcacc tagatcctt 4440  
 taaattaaaa atgaagtttt aatcaatct aaagtatata tgagtaaact tggctctgaca 4500  
 gttaccaatg cttatcaggt gaggcaccta tctcagcgat ctgtctatatt cgttcatcca 4560  
 tagttgcctg actcccgct gtgtagataa ctacgatacg ggagggtta ccatctggcc 4620  
 ccagtgcctg aatgataccg cgagaccac gctcaccgc tccagattta tcagcaataa 4680  
 accagccagc cggaggggcc gagcgagaa gtgtcctgc aactttatcc gcctccatcc 4740  
 agtctattaa ttgttgccgg gaagctagag taagtagttc gccagttat agtttgcgca 4800  
 acgttggttg cattgttaca ggcacgtgg tgtcacgctc gtcgtttgg atggcttcat 4860  
 tcagctccgg ttcccaacga tcaaggcgag ttacatgat ccccatgttg tgcaaaaaag 4920  
 cggtagctc cttcggctct ccgacgttg tcagaagtaa gttggccgca gtgttatcac 4980  
 tcatgggtat ggcagcact cataattctc ttaactgtcat gccatccgta agatgctttt 5040  
 ctgtgactgg tgagtaetca accaagtcac tctgagaata ccgcgcccg cgaccgagtt 5100  
 gctcttgccc ggcgtcaata cgggataata gtgtatgaca tagcagaact ttaaagtgc 5160  
 tcatcattgg aaaacgttct tcggggcgaa aactctcaag gatcttaccg ctgttgagat 5220  
 ccagttcgat gtaaccact cgtgcacca actgatcttc agcatctttt actttcacca 5280  
 gcgtttctgg gtgagcaaaa acaggaaggc aaaatgccgc aaaaaaggga ataaggcgca 5340  
 cacggaaatg ttgaatactc atactcttcc tttttcaata ttattgaagc atttatcagg 5400  
 gttattgtct catgagcgga tacatatttg aatgtattta gaaaaataaa caaatagggg 5460  
 ttccgcgcac atttcccga aaagtgccac ctgtatgcgg tgtgaaatac cgcacagatg 5520  
 cgtaaggaga aaatacega tcaggcgaaa ttgtaaacgt taatattttg ttaaaattcg 5580  
 cgttaaatat ttgttaaatc agtcatttt ttaaccaata gcccgaaatc ggcaaaatcc 5640  
 cttataaatc aaaagaatag accgagatag ggttgagtg tgttccagtt tggacaaga 5700  
 gtccactatt aaagaacgtg gactccaacg tcaaaggcg aaaaaccgtc tatcagggcg 5760  
 atggccact acgtgaacca tcaccctttt caagtttttt gcggtcgagg tgcgtaaaag 5820  
 ctctaaatcg gaacctaaa gggagcccc gatttagagc ttgacgggga aagccggcga 5880  
 acgtggcgag aaaggaagg aagaaagcga aaggagcggg cgtagggcg ctggcaagt 5940  
 tagcggctac gctgcgctga accaccacac ccgccgcgt taa 5983

&lt;210&gt; 31

&lt;211&gt; 7330

&lt;212&gt; DNA

&lt;213&gt; Artificial Sequence

&lt;220&gt;

&lt;223&gt; Description of Artificial Sequence: plasmid

&lt;400&gt; 31

```

ttgcggccgc ttcgaaagct gtaatataaa aaccttcttc aactaacggg gcagggttagt 60
gacattagaa aaccgactgt aaaaagtaca gtcggcatta tctcatatta taaaagccag 120
tcattaggcc tatctgacaa ttcctgaata gagttcataa acaatcctgc atgataacca 180
tcacaaacag aatgatgtac ctgtaaagat agcggtaa atattgaatt acctttatta 240
atgaattttc ctgctgtaat aatgggtaga aggtaattac tattattatt gatatttaag 300
ttaaaccag taaatgaagt ccatggaata atagaaagag aaaaagcatt ttcagggtata 360
ggtgttttgg gaaacaattt ccccgaaaca ttatatttct ctacatcaga aagggtataaa 420
tcataaaact ctttgaagtc attctttaca ggagtcctaa taccagagaa tggttttagat 480
acaccatcaa aaattgtata aagtggctct aacttatccc aataacctaa ctctccgtcg 540
ctattgtaac cagttctaaa agctgtattt gagtttatca cccttggtcac taagaaaata 600
aatgcagggt aaaatttata tccttcttgt tttatgtttc ggtataaaac actaatatca 660
atttctgtgg ttatactaaa agtcgtttgt tggttcaa atgattaaa tatctctttt 720
ctcttccaat tgtctaaatc aattttatta aagttcattt gatatgcctc cttaaatttt 780
atctaaagtg aatttaggag gcttacttgt ctgctttctt cattagaatc aatccttttt 840
taaaagtcaa tattactgta acataaatat atattttaaa aatatccac tttatccaat 900
tttcgtttgt tgaactaatg ggtgcttttag ttgaagaata aagaccacat taaaaaatgt 960
ggtcttttgt gtttttttaa aggatttgag cgtagcgaaa aatcettttc tttcttatct 1020
tgataataag ggtaactatt gaattcggta ccaagagttt gtagaaacgc aaaaaggcca 1080
tccgtcagga tggccttctg cttaatttga tgcctggcag tttatggcgg gcgtcctgcc 1140
cgccaccctc egggccgttg cttcgcaacg ttcaaatecg ctcccggcgg atttgtccta 1200
ctcaggagag cgttcaccga caaacaacag ataaaacgaa aggccagtc tttcgactga 1260
gcctttcgtt ttatttgatg cctggcagtt cctactctc gcattggggag accccacact 1320
accatcggcg ctacggcggt tcaacttctga gtteggcatg gggtcagggtg ggaccaccgc 1380
gctactgccg ccaggcaaat tctgttttat cagaccgctt ctgcgttctg atttaatctg 1440
tatcaggctg aaatcttctt ctcatecgcc aaaaaggat ccaattatgg cagatcaatg 1500
agcttcacag acacaatatc agggacattt gttagtctt tcacaatttt atcttcaga 1560
tgtctgtcaa aggaaagcat catgatggct tctccgcctt tttccttaag gccaacctgc 1620
atagttgcaa tgtaatatc attatctcag agaatacgtc ctactcgcc gatgacacct 1680
gttgatctt gatgctggat atacaccaag tgaccagtcg gataaaaatc aatattaaat 1740
ccattgatct cgacaattcg ttctccgaaa tgaggaatat acgtagccgt tacagtaaag 1800
gtgctgcggc ctctgtcac ttttacgtg atgcagttat cgtatccaga ttcagaagag 1860
gaaatttttt cactgaagct aatggcgcgt tcttttgca ccccccggc attgacctca 1920
ttaacagtag agtctacgcg cggtttttaa aagcctgaca gaagggttt tgtaatgaac 1980
gatgtttcaa gtttagcaat tgtgccttca tattgaatgg caacatcctg tactggttct 2040
ttcatgcact gtgatacaag gctgccattt tttcctgcaa tttgatgga aggcttaatt 2100
ttagcaaat catcttttgt catggcaggc aggttgatag ctgacatgac aggcaggcct 2160
tttgcaact gcagaacttc ttctgacact tggggcgcca cattgagctg tgottctttc 2220
gttgatgctc ccaagtgagg agtggaatg actaatggat gatcaacaag tttgttgtca 2280
actggcggtt cgacttcgaa aacgtcaagc gctgctccc caacatgcc gttttccaaa 2340
gcttcgagaa gtgctgcttc atcgataatt ccgcctcgcg cacagttaat taagcgaacg 2400
ccttttttgc tttttgcaat cgtttcttta ttcaataagc cttttgtttc ttttgttaaa 2460
ggcgtgtgaa cggtaatgat atccgcactt tcaagcactt cttcaaagt acggctgttt 2520
acgccgattt ttttcgctct ttcttcggtt aagaaaggat caaaaacgtg cacagtcata 2580
ccgaacgctc ctgcagctg tgcaatttca cttccgattc ggcctaatec tacaatacca 2640
agcgtttttc cataaagctc tgaaccgaca taagtgtgc ggtccactc tctggatttc 2700
actgagatat tagcctgcgg aatgtgtctc attaagaag agatcattgc aaatgtatgc 2760
tcagctgtcg aaatggtgtt gccgttcgga gcattgatca cgattacccc gtgtttcgta 2820
gcctcatcaa tatcgatatt atcgacaccg acaccggctc ttccgacaat ttttaaagaa 2880
gtcattttgt tgaaaaggtc ttctgttact tttgtcgcgc ttccgaccaa aagagcatca 2940
aaagtatgta attcatcttc tgcattctgt acgttttttt gaacgatttc aataaagtct 3000
gattcaataa gtggctgtaa accgtcgttg ctcattttgt ctgagaccaa tactcgaaac 3060
atgttttctc ctctctaga gcgtcctgct gttgttaaga ttattatacc acaccttgta 3120

```

gataaagtca acaactttttt gcaaaattttt tcaggaattt tagcagaggt tgttctggat 3180  
 gtagaacaaa acatctttcc gctcttgtgc tgtaggata tctttcttgg aagctaggta 3240  
 ggccctcgagt tatggcagtt ggtaaaaagg aaacaaaaag accgttttca cacaaaacgg 3300  
 tctttttcga tttcttttta cagtcacagc cactttttgca aaaaccggac agcttcatgc 3360  
 cttataactg ctgtttccgg cgacgaaaca tcgtagatt tcttcctaaa ttgacaaact 3420  
 aaatatctga taatttaaca tattctcaaa agagtgtcaa cgtgtattga cgcagtaaag 3480  
 gataaaaagta aagcctaata aatcaatgat ctgacagctt gcaggtaata tatttaattt 3540  
 gaagcaattc tctatacagc caaccagtta tcgtttataa tgtaattaaa tttcatatga 3600  
 tcaatcttcg gggcagggtg aaattcccta cggcggtga tgagccaatg gctctaagcc 3660  
 cgcgagctgt ctttacagca ggattcgggtg agattccgga gccgacagta cagtctggat 3720  
 gggagaagat ggaggttcat aagcgttttg aaattgaatt tttcaaactg tcttttgctt 3780  
 agcctaattt tcgaaacccc gcttttatat atgaagcggg ttttttattg gctggaaaag 3840  
 aacctttccg ttttcgagta agatgtgatc gaaaaggaga gaatgaagt aaagtaaaaa 3900  
 aattagttgt ggtcagcatg caagcttcgc gaagcggccg ccgacgcgag gctggatggc 3960  
 cttccccatt atgattcttc tcgcttcggg cggcatcggg atgcccgctg tgcaggccat 4020  
 gctgtccagg caggtagatg acgaccatca gggacagctt caaggatcgc tcgcggctct 4080  
 taccagccta acttcgatca ctggaccgct gatcgtcacg gcgatttatg ccgcctcggc 4140  
 gagcacatgg aacgggttgg catggattgt aggcgcggcc ctataccttg tctgcctccc 4200  
 cgcgttgcgt cgcggtgcat ggagccgggc cacctcgacc tgaatggaag ccggcggcac 4260  
 ctgcgtaacg gattcaccac tccaagaatt ggagccaatc aattcttgcg gagaactgtg 4320  
 aatgcgcaaa ccaacccttg gcagaacata tccatcgctt ccgcatctc cagcagccgc 4380  
 acgcggcgca tctcgggcag cgttgggtcc tggccacggg tcgcgatgat cgtgctcctg 4440  
 tcgttgagga ccgggctagg ctggcggggg tgcttactg gtagcagaa tgaatcaccg 4500  
 atacgcgagc gaactggaag cgactgtgc tgcaaaactg ctgcgacctg agcaacaaca 4560  
 tgaatggtct tcggtttccg tgttctgtaa agtctgaaa cgcggaagtc agcgcctgc 4620  
 accattatgt tccggatctg catcgcagga tgctgtggc taccctgtgg aacacctaca 4680  
 tctgtattaa cgaagcgtg gcattgacct tgagtattt ttctctggtc ccgcgcatac 4740  
 cataccgcca gttgtttacc ctcaaacgt tccagtaacc gggcatgttc atcatcagta 4800  
 acccgatcgc tgagcatcct ctctcgtttc atcggtatca ttaccccat gaacagaaat 4860  
 tcccccttac acggaggcat caagtgacca aacaggaaaa aaccgcccctt aacatggccc 4920  
 gctttatcag aagccagaca ttaacgcttc tggagaaact caacgagctg gacgcggatg 4980  
 aacaggcaga catctgtgaa tcgcttcacg accacgctga tgagctttac cgcagctgcc 5040  
 tcgcgcgttt cggtagtgac ggtgaaaacc tctgacacat gcagctcccg gagacgggtca 5100  
 cagcttgtct gtaagcggat gccgggagca gacaagcccg tcagggcgag tcagcgggtg 5160  
 ttggcgggtg tcggggcgca gccatgaccc agtcacgtag cgatagcgga gtgtatactg 5220  
 gcttaactat gcggcatcag agcagattgt actgagagt caccatatgc ggtgtgaaat 5280  
 accgcacaga tgcgtaagga gaaaataccg catcaggcgc tcttcgctt cctcgcctac 5340  
 tgactcgtg cgctcggctg ttcggctgcg gcgagcggta tcagctcact caaaggcggg 5400  
 aatacgggta tccacagaat caggggataa cgcaggaaaag aacatgtgag caaaaggcca 5460  
 gcaaaaggcc aggaaccgta aaaaggccgc gttgctggcg tttttccata ggctccgccc 5520  
 ccctgacgag catcagaaaa atcgacgctc aagtcagagg tggcgaaacc cgacaggact 5580  
 ataaagatac caggcgtttc cccctggaag ctccctcgtg cgctctcctg ttccgacctt 5640  
 gccgcttacc ggatacctgt ccgcctttct ccttcggga agcgtggcgc tttctcatag 5700  
 ctacagctgt aggtatctca gttcgggtga ggtcgttcgc tccaagctgg gctgtgtgca 5760  
 cgaaccccc gttcagcccg accgctgcgc cttatccggt aactatcgtc ttgagtccaa 5820  
 cccggtaaga cagcacttat cgcactggc agcagccact ggtaacagga ttagcagagc 5880  
 gaggtatgta ggcggtgcta cagagttctt gaagtgggtg cctaactacg gctacactag 5940  
 aaggacagta tttgggtatct gcgctctgct gaagccagtt accttcggaa aaagagttgg 6000  
 tagctcttga tccggcaaac aaaccacgc tggtagcggg ggtttttttg tttgcaagca 6060  
 gcagattacg cgcagaaaaa aaggatctca agaagatcct ttgatctttt ctaeggggtc 6120  
 tgacgctcag tggaaacgaa actcacgta agggattttg gtcagagat tatcaaaaag 6180  
 gatcttcacc tagatccttt taaattcaaa atgaagtttt aaatcaatct aaagtatata 6240  
 tgagtaaact tggcttgaca gttaccaatg cttaatcagt gaggcaccta tctcagcgt 6300  
 ctgtctatct cgttcatcca tagttgcctg actccccgtc gtgtagataa ctacgatac 6360  
 ggagggttta ccatctggcc ccagtgtgc aatgataccg cgagaccac gctcaccg 6420  
 tccagattta tcagcaataa accagccagc cgggaaggcc gagcgcagaa gtggctcctg 6480  
 aactttatcc gcctccatcc agtctattaa ttgttgccg gaagctagag taagtagttc 6540  
 gccagttaat agtttgcgca acgttgttgc cattgtgcga ggcacgtgg tgtcacgctc 6600  
 gtcgtttgg atggcttcat tcagctccgg ttcccaacga tcaaggcgag ttacatgatc 6660  
 cccatgttg tgcaaaaaag cggtagctc cttcggctct ccgacgttg tcagaagtaa 6720  
 gttggccgca gtgttatcac tcatgggtat ggcagcactg cataattctc ttactgtcat 6780

```
gccatccgta agatgctttt ctgtgactgg tgagtactca accaagtcac tctgagaata 6840
gtgtatgcgg cgaccgagtt gctcttgccc ggcgtcaata cgggataata ccgcgccaca 6900
tagcagaact ttaaaagtgc tcatcattgg aaaacgttct tcggggcgaa aactctcaag 6960
gatcttaccg ctgttgagat ccagttcgat gtaacccact cgtgcaccca actgatcttc 7020
agcatctttt actttcacca gcgtttctgg gtgagcaaaa acaggaaggc aaaatgccgc 7080
aaaaaaggga ataaggcgca cacggaaatg ttgaatactc atactcttcc tttttcaata 7140
ttattgaagc atttatcagg gttattgtct catgagcgga tacatatttg aatgtattta 7200
gaaaaataaa caaatagggg ttccgcgcac atttccccga aaagtgccac ctgacgtcta 7260
agaaaccatt attatcatga cattaaccta taaaaatagg cgtatcacga ggccctttcg 7320
tcttcaagaa 7330
```

**This Page is Inserted by IFW Indexing and Scanning  
Operations and is not part of the Official Record**

**BEST AVAILABLE IMAGES**

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- ☐ BLACK BORDERS
- ☐ IMAGE CUT OFF AT TOP, BOTTOM OR SIDES
- ☒ FADED TEXT OR DRAWING
- ☐ BLURRED OR ILLEGIBLE TEXT OR DRAWING
- ☐ SKEWED/SLANTED IMAGES
- ☐ COLOR OR BLACK AND WHITE PHOTOGRAPHS
- ☐ GRAY SCALE DOCUMENTS
- ☐ LINES OR MARKS ON ORIGINAL DOCUMENT
- ☒ REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY
- ☐ OTHER: \_\_\_\_\_

**IMAGES ARE BEST AVAILABLE COPY.**

**As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.**